

tered. The Oregonian, Portland, Oreg., of January 20, 1908, refers to storm warnings issued for this section as follows:

The season to date has been one of the stormiest on record, but the list of casualties so far is light. To the Weather Bureau this is largely due, as storm warnings have been sent out in advance of every storm. Shipowners and masters have been advised of the approach of heavy weather, and saving of life and property has been great.

This storm reached Lake Superior, with greatly diminished strength, on the morning of the 21st, and by the morning of 23d had past over Newfoundland. Moving northeastward the center of disturbance reached the vicinity of Iceland on the 25th, crossed the Scandinavian Peninsula during the 28th and 29th, and disappeared in the region of the White Sea after the 30th. From the 22d to the 25th a disturbance that apparently originated over the north-central portion of the West Indies moved northward off the Atlantic coast, with increasing intensity, attended by northerly gales and heavy snow in the Northeastern States. The Weather Bureau Observer, Mr. George E. Grimes, at Nantucket, Mass., has reported as follows regarding this storm:

This island was visited January 24 by the most severe storm in the history of the station. The storm began at 9:15 p. m., 23d, and continued until 3:41 a. m., 25th. The wind attained hurricane force at intervals from 2:37 a. m. to 4:46 p. m., of the 24th, and was accompanied by blinding snow. At 7:36 a. m., 24th, a maximum velocity of 83 miles an hour from the northeast was reached. The warnings were timely and no marine disasters have been reported in this vicinity. The greatest damage was to wharves and to fishing boats tied alongside, and was due mainly to the unusual high tide, that was 7.6 feet above mean low water. No lives were lost.

Following the passage of these depressions a cold wave swept the country east of the Rocky Mountains, carrying the line of freezing temperature to the middle and east Gulf coast and into the interior of central Florida. The following from Mr. A. H. Brown, manager of the Atwood Grapefruit Grove at Manavista, on the north bank of the Manatee River and opposite Manatee, Fla., to the Weather Bureau observer at Tampa indicates the value of the cold-wave and frost warnings and methods of protection employed in the citrus fruit districts of Florida. The Atwood Grove is one of the most valuable groves in the State, and its manager depends on the Weather Bureau predictions for action to protect his grove from freezes. The preparation for firing, and the materials used for protection at this grove cost, during the past year, upward of ten thousand dollars.

January 25, 1908.—We had a pretty close call last night. The temperature fell to 27° in our grove at 2 a. m., and as we had all arrangements made for firing we thought it time to get busy. We had forty men, and in forty minutes from the time we started firing the entire 200 acres were fired, with the result that we pushed the thermometer up to 37° in less than a half hour and held it there until daylight; and not a leaf was injured.

We depend greatly upon your reports and they mean a great deal to us, because we are prepared to fight the cold when it comes.

From the 23d to the close of the month four additional depressions of marked strength appeared over the North American Continent. The first of these advanced from the British Northwest Territory on the 24th, to the Great Lakes and thence northeastward to a position off the Scandinavian coast by the close of the month, with reported readings below 29.00 in the St. Lawrence Valley on the 27th. From the 23d to 31st a disturbance advanced from the Pacific Ocean to Newfoundland, crossing California on the 25th and 26th, reaching the south Atlantic coast on the 29th, and passing thence northeastward. From the 26th to 31st a depression moved from the British Northwest Territory to Newfoundland, and from the 28th to the 31st a storm that acquired marked strength moved from the north Pacific coast southeastward over the Rocky Mountain districts, and thence northeastward to northern Illinois by the close of the month.

The coldest periods of the present winter followed these disturbances. On the 29th the temperature was 42° below zero

in Manitoba, and the line of zero temperature was traced over central Illinois. On the 30th zero temperatures were reported in the interior of New York and New England, and a minimum of 28° below zero was registered at Canton, N. Y.

BOSTON FORECAST DISTRICT.*

[New England.]

The month was mild and precipitation was below the average. There was an unusual number of severe gales, and shipping was delayed, endangered, and in a few instances damaged. Storm warning displays were timely and doubtless resulted in a great saving of property and probably of human life. There were no storms without warnings.—*J. W. Smith, District Forecaster.*

NEW ORLEANS FORECAST DISTRICT.*

[Louisiana, Texas, Oklahoma, and Arkansas.]

The month was abnormally warm and precipitation was deficient. Warnings for freezing temperature and frost and for high winds on the coast were timely, and all were practically verified.—*I. M. Cline, District Forecaster.*

LOUISVILLE FORECAST DISTRICT.*

[Kentucky and Tennessee.]

As a whole the month was mild and unusually pleasant, and the cold periods were confined to the third decade. Precipitation was deficient and snowfall light. The cold-wave warnings of the latter portion of the month were of general and decided benefit.—*F. J. Walz, District Forecaster.*

CHICAGO FORECAST DISTRICT.*

[Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, and Montana.]

The month was comparatively mild. There were two severe snow and wind storms during the second decade of the month. The severest storm occurred at the close of the month. The storms were followed by moderate cold waves. Timely warnings were issued in advance of the storms and it is thought that great benefit resulted.—*H. J. Cox, Professor and District Forecaster.*

DENVER FORECAST DISTRICT.*

[Wyoming, Colorado, Utah, New Mexico, and Arizona.]

The month was mild and dry. On the 16th, 29th, and 31st cold waves visited portions of the district. The usual warnings had been issued for the cold waves of the last two dates.—*F. H. Brandenburg, District Forecaster.*

SAN FRANCISCO FORECAST DISTRICT.†

[California and Nevada.]

Rainfall and temperature were nearly normal. Generous rains at the middle and close of the month afforded desired relief in the southern portion of California. The most important storm occurred on the 23d, and moderately high southerly winds were reported on the entire coast.—*A. G. McAdie, Professor and District Forecaster.*

PORTLAND, OREG., FORECAST DISTRICT.†

[Oregon, Washington, and Idaho.]

The first two decades of the month were stormy and unusually high winds occurred on the 5th and 19th. Timely warnings were issued for all storms. The month closed with a cold wave, for which warnings were issued.—*E. A. Beals, District Forecaster.*

RIVERS AND FLOODS.

The great rivers of the country maintained their usual early winter repose. While the month of January was far from being a cold one, there were no heavy warm rains to bring about a rapid melting of the comparatively small amount of snow

* Morning forecasts made at district center; night forecasts made at Washington, D. C.

† Morning and night forecasts made at district center.

over the watersheds. The only flood stages reached in the north were in the Illinois and Wabash rivers during the first six days of the month. They were caused by the moderate rains of the last ten days of December, 1907, and the crest stages were but a foot or two above the flood stage. Warnings were issued at the proper time.

There was a little more activity in the southern rivers, but no really high stages occurred. The greatest proportionate rises occurred in the rivers of the Carolinas from the heavy rains that fell from the 5th to the 12th, inclusive. The rise in the Pedee River had also been preceded by another more moderate one on the first day of the month. Warnings were issued promptly whenever necessary, and they were of great benefit to the cattle and lumber interests in the lowlands.

ICE.

At the end of December, 1907, the Mississippi River was frozen as far south as Prairie du Chien, Wis., and at the end of January, 1908, this was still practically the southern limit of solid ice, altho there had been some increase in its thickness. No floating ice was observed very far below the mouth of the Ohio River. The Missouri River at the end of the month was frozen over as far as the mouth of the James River, but only thinly in the neighborhood of Yankton, S. Dak. The cold wave of the 29th closed the river as far down as Sioux City, Iowa, where the closing caused a considerable rise in the river, and a forcing of the main channel to the Nebraska side of the river for the first time in three or four years. In the Ohio River floating ice was observed on various dates, but very little below the mouth of the Kentucky River. Nothing unusual occurred in the rivers of the North Atlantic system, and there was much less ice than during January, 1907. The Connecticut River at Hartford, Conn., remained open, altho at times it was full of heavy floating ice.

SNOW.

The following information has been condensed from the snow bulletins issued in the Western States, where the water supply for purposes of irrigation is dependent upon the amount of run-off from the melted snow:

Arizona.—Less snow than in December, 1907, and but little remaining on the ground at the end of January, 1908. In the valleys there was practically none.

Colorado.—The snowfall was less than usual, as a whole, altho there was a slight excess in the upper watersheds of the Gunnison, Grand, and Yampa rivers. Thruout the southern third of the State the snowfall to date has been very light, but over the remainder a normal fall during the re-

mainder of the season will insure an average flow of water on the western slope, and somewhat less in the Arkansas and South Platte rivers.

Idaho.—Some improvement in the snow situation in the northern portion of the State, but elsewhere the reverse. High temperatures interfered with the prospects and there are no present indications of an excess of water in any locality. In some a deficiency is likely.

Montana.—Snowfall deficient, and ground dry to an unusual depth. An average supply of water is not probable even if the snowfall during February and March should be heavy.

Nevada.—An average flow of water is now indicated. Altho this season's snow is deficient in quantity, there was considerable old snow near the summits of the mountains at the beginning of the season.

New Mexico.—Little snow during the month in the valleys, but a considerable increase in stored depth in the mountains. Prospects are favorable for a good water supply except over the Canadian watershed.

Utah.—The snowfall during the month was deficient, but there appears to be about an average amount on the ground.

Oregon.—The snowfall was much less than in 1907, and was also much less than the normal amount. However, the snow in the mountains is well drifted into the canyons, and is packed solidly, insuring a gradual melting during the spring months.

California.—The snowfall was not as heavy as it was in January, 1907, and only a moderate amount remained on the ground at the end of the month. Nevertheless it is well-packed at the higher elevations and there will probably be an ample supply of water.

Washington.—The snowfall was deficient, but compact owing to rains. Prospects are favorable for an ample water supply.

Wyoming.—Conditions on the whole are very favorable, except over the eastern slope of the Big Horn Mountains. Over nearly all sections of the State there is a good supply of well-packed snow.

The highest and lowest water, mean stage, and monthly range at 191 river stations are given in Table IV. Hydrographs for typical points on seven principal rivers are shown on Chart I. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—*H. C. Frankenfield, Professor of Meteorology.*

SPECIAL ARTICLES, NOTES, AND EXTRACTS.

MR. FRANK RIDGWAY.

Mr. Frank Ridgway, Local Forecaster of the Weather Bureau, whose death from pneumonia occurred December 31, 1907, at Pittsburg, Pa., entered the Weather Service, then a branch of the Signal Corps of the Army, January 25, 1879, and with the exception of about eight months in 1884 served continuously until May, 1906, when he was given leave of absence without pay to enable him to accept the position of Director of Public Safety at Pittsburg, Pa., to which position he had been appointed by the mayor of that city.

Mr. Ridgway served at a large number of stations of the Bureau, and always with credit, but his principal, most important, and valuable service was while in charge of the station at Pittsburg from June, 1896, to May, 1906. His administration there was characterized by great efficiency, and he was several times commended for accuracy in river forecasting and for effective work in the distribution of warnings in connection with the frequent floods at that station.

Mr. Ridgway was a man of most genial and attractive per-

sonality, high character, and fine social attainments, and was widely known and respected in the city where he resided, and thruout the service generally.—*H. E. W.*

RECENT ADDITIONS TO THE WEATHER BUREAU LIBRARY.

H. H. KIMBALL, Librarian.

The following titles have been selected from among the books recently received, as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies. Most of them can be loaned for a limited time to officials and employees who make application for them. Anonymous publications are indicated by a —.

Bechtle, A.
Das Klima des Rieses und seiner Umgebung. Nördlingen. 1907. 49 p. 8°.

Berget, A.
Les courants marins. Le Gulf-Stream. Monaco. 1906. 19 p. 8°.
(Bull. Musée océanographique de Monaco. No. 73. 10 mai 1906.)
Utilité de l'étude des courants. Monaco. 1906. 18 p. 8°.
(Bull. Musée océanographique de Monaco. No. 77. 5 juin 1906.)